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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,138	01/07/2004	Francesco De Rege Thesauro	100185	4430
29050	7590	07/26/2005	EXAMINER	
STEVEN D WESEMAN, ASSOCIATE GENERAL COUNSEL, IP CABOT MICROELECTRONICS CORPORATION 870 NORTH COMMONS DRIVE AURORA, IL 60504			MULLER, BRYAN R	
			ART UNIT	PAPER NUMBER
			3723	

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/753,138	DE REGE THESAURO ET AL.	
	Examiner	Art Unit	
	Bryan R. Muller	3723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 09 May 2005.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-3,6-10,13-21 and 31-39 is/are pending in the application.  
 4a) Of the above claim(s) 31 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-3,6-10,13-21 and 32-39 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) 31 are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claim 31 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/04/2005. Claim 31 does not read on the elected species I, which comprises a free abrasive. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.
2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Information Disclosure Statement***

3. The information disclosure statement filed 1/7/2004 fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the

examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered. There is no PTO-1449 Form filed with the Information Disclosure Statement.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 6-9, 13, 14, 16-18, 20, 21, 32-34 and 36-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (2002/0182982) in view of Hartner et al (2002/0086511).

6. In reference to claim 1, Li discloses a polishing composition for use in a CMP polishing system, wherein the method of use comprises, providing a substrate comprising a metal in oxidized form (copper oxide; paragraphs 42 and 43), contacting a portion of the substrate with a CMP polishing system comprising a polishing pad (paragraph 7) and a slurry (liquid carrier) with abrasive particles (paragraph 8) and a reducing agent (paragraph 62) therein and abrading at least a portion of the metal oxidized form to polish the substrate. Li further discloses that the reducing agent may be hydroxylamine (paragraph 62, lines 3 and 4). Li however fails to disclose that the

metal in oxidized form may be a noble metal selected from the group consisting of platinum, iridium, ruthenium, rhodium, palladium, silver, osmium, gold and combinations thereof. Hartner discloses a method for fabricating a patterned layer on a substrate that incorporates a step of chemical mechanical polishing a layer of iridium oxide (paragraphs 43 and 44) to produce a layer on the substrate that is self-aligned and self-patterned. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the oxidized metal to be polished may have been iridium oxide as used in the method of Hartner to produce a layer on the substrate that is self-aligned and self-patterned. This would have been advantageous because the pattern would not have to be etched, which is difficult and creates another step in the process, thus saving time and increasing production.

7. In reference to claim 2, the obvious combination of Li and Hartner discloses polishing a substrate comprising iridium oxide, which is an oxide form of oxidation.

8. In reference to claim 3, the molecular formula for iridium Oxide is "IrO<sub>2</sub>", which is equivalent to Ir<sub>1</sub>O<sub>2</sub>. Therefore, in the form M<sub>x</sub>O<sub>y</sub>, y is greater than x.

9. In reference to claim 6, the obvious combination of Li and Hartner discloses polishing a substrate comprising iridium oxide, as discussed supra.

10. In reference to claims 7-9, 13 and 14, Li discloses that the reducing agent may be hydroxylamine, as discussed supra, and that the abrasive disposed in the liquid carrier may be silica (paragraph 63).

11. In reference to claims 16-18, Li discloses that the abrasive suspended in the liquid carrier (slurry), may include silica, as discussed supra.

12. In reference to claim 20, Li discloses that the reducing agent may be hydroxylamine, as discussed *supra*.
13. In reference to claim 21, Li discloses that the reducing agent may comprise between 0.01-20 weight % of the complexing solution (paragraph 62) and the complexing solution comprises about 0.5% of the polishing composition. Therefore, if the reducing agent were 20% of the complexing solution, then it would be 0.1% of the polishing composition.
14. In reference to claim 32, Li further discloses that the liquid carrier may be water (paragraph 18).
15. In reference to claim 33, Li further discloses that the CMP system comprises a complexing agent (paragraph 16).
16. In reference to claim 34, Li further discloses that the CMP system comprises a pH-adjusting agent, which generates or *maintains* a desired pH. The definition of buffering is "a substance that minimizes change in the acidity of a solution when an acid or base is added to the solution" (*The American Heritage® Dictionary of the English Language, Fourth Edition Copyright © 2000 by Houghton Mifflin Company. Published by Houghton Mifflin Company. All rights reserved.*), thus the pH-adjusting agent, as disclosed by Li, is a pH buffering agent in that it maintains (minimizes change) a pH.
17. In reference to claims 36 and 37, the obvious combination of Li and Hartner discloses the polishing method, as discussed *supra* in reference to claim 1, and Li further discloses that the reducing agent may be present in the amount of 0.1 wt%

based on the weight of the liquid carrier and any components dissolved or suspended therein, as discussed supra with reference to claim 21.

18. In reference to claim 38, the obvious combination of Li and Hartner discloses the polishing method, as discussed supra in reference to claim 1, and Li further discloses that the polishing system **may** comprise an oxidizing agent and that embodiments of the invention comprise an oxidizing agent (paragraph 49). Thus, the polishing system, as disclosed by Li does not require an oxidizing agent and would therefore have at least one embodiment that does not contain an oxidizing agent.

19. In reference to claim 39, the obvious combination of Li and Hartner discloses the polishing method, as discussed supra in reference to claim 1, and Li further discloses that the polishing component may comprise alumina, silica, titania or ceria particles, none of which are a mixture of  $\alpha$ -alumina and fumed alumina. Thus, the polishing system, as disclosed by Li does not comprise a mixture of  $\alpha$ -alumina and fumed alumina.

20. Claims 10, 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (2002/0182982) in view of Hartner et al (2002/0086511) as applied to claims 8, 13 and 17 respectively and further in view of Rosenflanz (6,454,822).

21. The obvious combination of Li and Hartner discloses the method of polishing a substrate as discussed supra and Li further discloses that the abrasive particles may be alumina (paragraph 63), but fails to disclose that the abrasive particles may be  $\alpha$ -alumina. Rosenflanz discloses that sol-gel-derived  $\alpha$ -alumina particles, when used as

abrasives on metals, have a longer life than conventional alumina particles (col. 2, lines 13-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use sol-gel-derived  $\alpha$ -alumina particles instead of the alumina particles of Li, to provide a longer life for the particle, as taught by Rosenflanz.

22. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al (2002/0182982) in view of Hartner et al (2002/0086511) as applied to claim 1, and further in view of Kaufman et al (5,783,489).

23. The obvious combination of Li and Hartner discloses the method of polishing a substrate as discussed supra, but fails to disclose that the CMP system comprises a surfactant. Kaufman discloses a CMP slurry and teaches that a surfactant may be added to promote stabilization of the slurry and improve the within-wafer-non-uniformity (WIWNU) thereby improving the surface of the wafer and reducing wafer defects (col. 6, lines 39-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a surfactant to the CMP system of Li to promote stabilization of the slurry, improve the surface of the wafer and reducing wafer defects, as taught by Kaufman.

### ***Response to Arguments***

24. Applicant's arguments filed 5/09/2005 have been fully considered but they are not persuasive.

25. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Applicant argues that there is no motivation to combine Li et al and Hartner et al because the Li composition would not be sufficient to polish noble metals because of their material properties and that Hartner does not disclose anything that would imply that the Li CMP process could polish the barrier material of iridium oxide. However, the teachings of Hartner provides motivation to use the disclosed process with any substrate to produce a patterned layer, which would remove the need for an etching step to form the pattern, which would save time and increase production, as discussed supra. Further, the Hartner reference does not disclose any particular CMP step is necessary to polish the process the iridium oxide layer, so it would be obvious to one of ordinary skill in the art that the CMP process of Li would be sufficient to process the iridium oxide layer of Hartner in the process disclosed by Hartner.

26. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, The applicant argues that there is no motivation to combine the teachings of Rosenflanz with the disclosure of Li et al because the Rosenflanz disclosure does not suggest that sol-gel derived  $\alpha$ -alumina particles are suited for use in a CMP method. However, the alumina particles of Li are used as an abrasive on metals and the Rosenflanz specifically teaches that sol-gel derived  $\alpha$ -alumina particles have a longer life than standard alumina particles *when used as an abrasive on metals*. Thus, the teachings of Rosenflanz to use sol-gel derived  $\alpha$ -alumina particles in place of standard alumina particles is particularly relevant in this application.

### ***Conclusion***

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

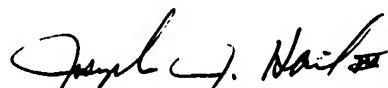
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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan R. Muller whose telephone number is (571) 272-4489. The examiner can normally be reached on Monday thru Thursday and second Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J. Hail III can be reached on (571) 272-4485. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



BRM  
7/12/2005

Joseph J. Hail, III  
Supervisory Patent Examiner  
Technology Center 3700